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ethylene thiourea



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## Rubber Curing Systems

**Author:** R.N. Datta, Flexsys BV*Table of Contents***ISBN 1-85957-326-6**

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This is an excellent overview of a complex subject. Rubber curing systems vary both with the polymer type and the property requirements of a particular application. This review addresses these issues in detail, providing typical formulations and cure types for a number of specific uses.

The crosslinking of polymer molecules, also known as curing, is widely used to improve the physical properties of elastomeric materials. Sulfur was the first curing agent for natural rubber, it was used by Charles Goodyear in the 1840s. Since that time many new rubber types have been developed and many additional chemicals have been introduced as components of vulcanisation systems.

The rubber industry has developed a powerful armoury of curing agents, including sulphur sources, peroxides, metal oxides, amines, and phenolic resins. Choosing the correct curing system is vital to obtain a material with the best properties for a specific application. However, the pressure for safer and even more effective curing agents means that innovation remains at a premium. For example, ethylene thiourea, one of the most popular curing agents for chloroprene rubber, has come under suspicion as a carcinogen and teratogen.

This review discusses the different types of curing systems available today for different rubber types, including natural rubber, SBR, NBR, BR, IIR, CR, XIIR and EPDM. The uses of primary and secondary accelerators, prevulcanisation inhibitors (PVI's) and antireversion chemicals are outlined.

Typical rubber formulations for applications in industrial rubber products and tyres are given. Cure systems are described and compared with extensive tables of data on formulae and compound properties. Tyres contain many different rubber formulations with varying property requirements. This report examines the cure systems in use for each part of the tyre. Investigations have recently been reported on the functionalisation

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of silica filler with curing agents for use in green tyres. Industrial rubber products such as conveyor belting are also discussed.

This review is accessible to anyone with a rudimentary knowledge of the polymer industry. The introduction briefly describes the terminology of curing, enabling the reader to gain full benefit from the detailed data in the rest of the text.

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### **About the Author**

Dr Datta is a leading expert in the field of rubber chemicals and has worked

in both academia and industry. In 1990 he joined Akzo Nobel Rubber Chemicals as a research scientist and is currently Market Development Manager at Flexsys BV in the Netherlands. He also holds the post of Assistant Professor in the University of Twente. Dr Datta has an extensive publications list including over 75 technical papers and 30 patents.

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